No. 8600047

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Pioneer Hi-Bred International, Inc.

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF eighteen YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

CORN

'PHG29'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D. C. this 30th day of September in the year of our Lord one thousand nine hundred and eighty-six.

Attest:

Kenneth B. Evans
Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Richard E. Lyng
Secretary of Agriculture

APPROVAL EXPIRES 4-30-86

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions on reverse)

FORM APPROVED: OMB NO. 0581-0055

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S)
Pioneer Hi-Bred International, Inc.

2. TEMPORARY DESIGNATION

3. VARIETY NAME
PHG29

4. ADDRESS *(Street and No. or R.F.D. No., City, State, and Zip Code)*
Plant Breeding Division
Department of Corn Breeding
PO Box 85, Johnston, IA 50131-0085

5. PHONE *(Include area code)*
515/270-3300

FOR OFFICIAL USE ONLY
PVPO NUMBER 8600047

6. GENUS AND SPECIES NAME
Zea mays

7. FAMILY NAME *(Botanical)*
Gramineae

FILING
DATE 1/6/86
TIME 2:00 ☐ A.M. ☒ P.M.

8. KIND NAME
Corn

9. DATE OF DETERMINATION
1980

FEES RECEIVED
AMOUNT FOR FILING
$ 1800
DATE 1/6/86
AMOUNT FOR CERTIFICATE
$ 200.00
DATE 8/25/86

10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION *(Corporation, partnership, association, etc.)*
Corporation

11. IF INCORPORATED, GIVE STATE OF INCORPORATION
Iowa

12. DATE OF INCORPORATION
May 6, 1926

13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS
Dr. Richard L. McConnell
Pioneer Hi-Bred International, Inc.
Plant Breeding Division
PO Box 85, Johnston, IA 50131-0085
PHONE *(Include area code)*: 515/270-3363

14 CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED

a. ☒ Exhibit A, Origin and Breeding History of the Variety *(See Section 52 of the Plant Variety Protection Act.)*
b. ☒ Exhibit B, Novelty Statement.
c. ☒ Exhibit C, Objective Description of Variety *(Request form from Plant Variety Protection Office.)*
d. ☒ Exhibit D, Additional Description of Variety.
e. ☒ Exhibit E, Statement of the Basis of Applicant's Ownership.

15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? *(See Section 83(a) of the Plant Variety Protection Act.)* ☐ Yes *(If "Yes," answer items 16 and 17 below)* ☒ No

16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?
☐ Yes ☐ No

17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED?
☐ Foundation ☐ Registered ☐ Certified

18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.?
☐ Yes *(If "Yes," give date)*
☒ No

19. HAS THE VARIETY BEEN RELEASED, OFFERED FOR SALE, OR MARKETED IN THE U.S. OR OTHER COUNTRIES?
☐ Yes *(If "Yes," give names of countries and dates)*
☒ No

20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in Section 41, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF APPLICANT
Pioneer Hi-Bred International, Inc.
by:

DATE

SIGNATURE OF APPLICANT
Richard L McConnell

DATE
December 30, 1985

FORM WA-470 (7-84) (Edition of 3-84 is obsolete.)

1

C O R N

'PHG29'

14A. Exhibit A. Origin and Breeding History

Pedigree: 207<2806)8123225X

Pioneer line PHG29, Zea mays L., a yellow dent corn inbred, was developed by Pioneer Hi-Bred International, Inc. from the single cross 207 x 806 backcrossed to 207 followed by selfing and selection using the pedigree method of breeding. The progenitors of PHG29 are proprietary inbred lines of Pioneer Hi-Bred International, Inc. Selfing and selection was practiced within the above backcross population for eight generations in the development of PHG29. The inbred line was developed at Mankato, Minnesota, with some winter nursery selections being made at Homestead, Florida, and Kauai, Hawaii. During line development, the F4 generation was crossed to an inbred tester for the purpose of estimating the lines combining ability. Yield trials were grown in 1978. Additional hybrid combinations have been evaluated and subsequent generations of the line were grown and hand-pollinated with observations made for uniformity.

PHG29 has shown uniformity and stability for all traits as described in Exhibit C (form LPGS-470-28) - "Objective Description of Variety". It has been self-pollinated and ear-rowed a sufficient number of generations with careful attention paid to uniformity of plant type to assure genetic homozygosity and phenotypic stability. The line has been increased both by hand and in isolated fields with continued observations for uniformity.

No variant traits have been observed or expected in PHG29.

14B. Exhibit B. Novelty Statement for 'PHG29'

PHG29 is most similar to the Pioneer proprietary inbred line 207 for general appearance. PHG29 differs from 207 by having green glumes versus red glumes for 207. PHG29 also reaches anthesis later than 207. PHG29 reaches fifty percent pollen shed and fifty percent silk, 60 and 70 heat units, respectively, later than 207. These data for differences in pollen shed and silk emergences are the result of observations recorded at many locations within the Corn Belt.

FORM APPROVED: OMB NO. 40-R3822

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
LIVESTOCK, POULTRY, GRAIN & SEED DIVISION
BELTSVILLE, MARYLAND 20705

EXHIBIT C
(Corn)

OBJECTIVE DESCRIPTION OF VARIETY
CORN *(ZEA MAYS)*

NAME OF APPLICANT(S)
Pioneer Hi-Bred International, Inc.

ADDRESS *(Street and No. or R.F.D. No., City, State, and ZIP Code)*
Plant Breeding Division
Department of Corn Breeding
PO Box 85
Johnston, Ia. 50131-0085

FOR OFFICIAL USE ONLY
PVPO NUMBER 8600047

VARIETY NAME OR TEMPORARY DESIGNATION
PHG29

Place the appropriate number that describes the varietal character of this variety in the boxes below.
Place a zero in first box (e.g. [0][8][9] or [0][9]) when number is either 99 or less or 9 or less.

1. TYPE:

[2] 1 = SWEET 2 = DENT 3 = FLINT 4 = FLOUR 5 = POP 6 = ORNAMENTAL

2. REGION WHERE BEST ADAPTED IN THE U.S.A.:

[2] 1 = NORTHWEST 2 = NORTHCENTRAL 3 = NORTHEAST 4 = SOUTHEAST
5 = SOUTHCENTRAL 6 = SOUTHWEST 7 = MOST REGIONS

3. MATURITY (In Region of Best Adaptability):

(Under "comments" (pg. 3) state how heat units were calculated)

[6][8] DAYS FROM EMERGENCE TO 50% OF PLANTS IN SILK	[1][4][8][0]	HEAT UNITS
[ ][ ] DAYS FROM 50% SILK TO OPTIMUM EOIBLE QUALITY	[ ][ ][ ][ ]	HEAT UNITS
[ ][ ] DAYS FROM 50% SILK TO HARVEST AT 25% KERNEL MOISTURE	[ ][ ][ ][ ]	HEAT UNITS

4. PLANT:

[1][8][0] CM. HEIGHT (To tassel tip)

[0][6][3] CM. EAR HEIGHT (To base of top ear)

[0][6] CM. LENGTH OF TOP EAR INTERNODE

Number of Tillers:

[1] 1 = NONE 2 = 1–2 3 = 2–3 4 = > 3

Number of Ears Per Stalk:

[1] 1 = SINGLE 2 = SLIGHT TWO-EAR TENDENCY
3 = STRONG TWO-EAR TENDENCY 4 = THREE-EAR TENDENCY

Cytoplasm Type:

[1] 1 = NORMAL 2 = "T" 3 = "S" 4 = "C" 5 = OTHER (Specify) _____

5. LEAF (Field Corn Inbred Examples Given):

Color:

[3] 1 = LIGHT GREEN (HY) 2 = MEDIUM GREEN (WF9) 3 = DARK GREEN (B14) 4 = VERY OARK GREEN (K166)

Angle from Stalk (Upper half):

[2] 1 = < 30° 2 = 30–60° 3 = > 60°

Sheath Pubscence:

[1] 1 = LIGHT (W22) 2 = MEDIUM (WF9)
3 = HEAVY (OH26)

Marginal Waves:

[1] 1 = NONE (HY) 2 = FEW (WF9) 3 = MANY (OH7L)

Longitudinal Creases:

[2] 1 = ABSENT (OH51) 2 = FEW (OH56A)
3 = MANY (PA11)

Width:

[0][9] CM. WIDEST POINT OF EAR NODE LEAF

Length:

[0][7][8] CM. EAR NODE LEAF

[1][7] NUMBER OF LEAVES PER MATURE PLANT

6. TASSEL:

[1][8] NUMBER OF LATERAL BRANCHES

Branch Angle from Central Spike:

[3] 1 = < 30° 2 - 30–40° 3 - > 45°

Peduncle Length:

[1][5] CM. FROM TOP LEAF TO BASAL BRANCHES

Pollen Shed:

[2] 1 - LIGHT (WF9) 2 - MEDIUM 3 = HEAVY(KY21)

[3] Anther Color:
[5] Glume Color:
1 YELLOW 2 - PINK 3 - RED 4 = PURPLE 5 = GREEN
6 OTHER (Specify) _____

Pollen Restoration for Cytoplasms (0 = Not Tested, 1 = Partial, 2 = Good)

[0] "T" [0] "S" [0] "C" [ ] OTHER (Specify Cytoplasm and degrees of restoration) _____

7. EAR (Husked Ear Data Except When Stated Otherwise):

[1][7] CM LENGTH [3][7] MM. MID-POINT DIAMETER [9][2] GM. WEIGHT

Kernel Rows:

[2] 1 - INDISTINCT 2 DISTINCT [1][4] NUMBER

[1] 1 STRAIGHT 2 SLIGHTLY CURVED 3 SPIRAL

Silk Color (Exposed at Silking Stage):

[4] 1 = GREEN 2 - PINK 3 SALMON 4 = RED

Husk Color:

[2] FRESH
[6] DRY
1 - LIGHT GREEN 2 - DARK GREEN 3 - PINK
4 RED 5 - PURPLE 6 = BUFF

Husk Extention: (Harvest Stage)

[2] 1 = SHORT (Ears Exposed) 2 = MEDIUM (Barely Covering Ear)
3 = LONG (8–10CM Beyond Ear Tip)
4 = VERY LONG (> 10 CM)

Husk Leaf:

[ ] 1 = SHORT (< 8 CM) 2 = MEDIUM (8–15 CM)
3 = LONG (> 15 CM)

Shank:

[1][2] CM LONG [6] NO. OF INTERNODES

Position at Dry Husk Stage:

[3] 1 UPRIGHT 2 HORIZONTAL 3 - PENDENT

Taper:

[3] 1 SLIGHT 2 - AVERAGE 3 - EXTREME

Drying Time (Unhusked Ear):

[ ] 1 - SLOW 2 AVERAGE 3 - FAST

8. KERNEL (Dried):

Size (From Ear Mid-Point):

[0][9] MM LONG [0][6] MM. WIDE [0][4] MM. THICK

Shape Grade (% Rounds)

[1] 1 = < 20 2 - 20–40 3 - 40–60 4 - 60–80 5 = > 80

5

8. KERNEL (Dried) :

[1] **Pericarp Color:** 1 - COLORLESS 2 - RED-WHITE CROWN 3 - TAN 4 - BRONZE 5 - BROWN 6 - LIGHT REO 7 - CHERRY RED 8 - VARIEGATED (Describe) _____

[1] **Aleurone Color:** 1 - HOMOZYGOUS 2 - SEGREGATING (Describe) _____

[1] 1 WHITE 2 - PINK 3 - TAN 4 - BROWN 5 - BRONZE 6 - RED 7 - PURPLE 8 - PALE PURPLE 9 - VARIEGATED (Describe) _____

[3] **Endosperm Color:** 1 - WHITE 2 - PALE YELLOW 3 - YELLOW 4 - PINK-ORANGE 5 - WHITE CAP.

Endosperm Type:

[3] 1 - SWEET (su1) 2 - EXTRA SWEET (sh2) 3 - NORMAL STARCH 4 - HIGH AMYLOSE STARCH 5 - WAXY STARCH 6 - HIGH PROTEIN 7 - HIGH LYSINE 8 - OTHER (Specify) _____

[1][9] GM. WEIGHT /100 SEEDS (Unsized Sample)

9. COB:

[2][1] MM. DIAMETER AT MID-POINT

Strength:

[1] 1 WEAK 2 - STRONG

Color:

[3] 1 - WHITE 2 - PINK 3 RED 4 BROWN 5 - VARIEGATED 6 OTHER (Specify) _____

10. DISEASE RESISTANCE (0 = Not Tested, 1 = Susceptible, 2 = ~~Resistant~~ Tolerant):

[1]	STALK ROT (Diplodia)	[1]	STALK ROT (Fusarium)	[1]	STALK ROT (Gibberella)
[2]	NORTHERN LEAF BLIGHT	[1]	SOUTHERN LEAF BLIGHT	[2]	SMUT (Common)
[0]	SOUTHERN RUST	[1]	CORN SMUT (Head)	[1]	BACTERIAL WILT (Stewart's)
[2]	BACTERIAL LEAF BLIGHT (Goss)	[1]	MAIZE DWARF MOSAIC	[0]	STUNT
[ ]	OTHER (Specify)				

11. INSECT RESISTANCT (0 = Not Tested, 1 = Susceptible, 2 = ~~Resistant~~ Tolerant):

[1]	CORNBORER	[0]	EARWORM	[0]	SAPBEETLE	[0]	APHID
[0]	ROOTWORM (Northern)	[0]	ROOTWORM (Western)				
[0]	ROOTWORM (Southern)	[ ]	OTHER (Specify) _____				

12. VARIETIES MOST CLOSELY RESEMBLING THAT SUBMITTED FOR THE CHARACTERS GIVEN:

CHARACTER	VARIETY	CHARACTER	VARIETY
Maturity	207	Kernel Type	207
Plant Type	207	Quality (Edible)	
Ear Type	207	Usage	207

REFERENCES:

U.S. Department Agriculture. Yearbook 1937.

Corn: Culture, Processing, Products. 1970 Avi Publishing Company, Westport, Connecticut. (Numerous (Authors)

Emerson, R.A., G.W. Beadle, and A.C. Fraser. A Summary of Linkage Studies in Maize.Cornell A.E.S., Mem. 180. 1935.

The Mutants of Maize. 1968. Crop Science Society of America. Madison, Wisconsin.

Stringfield, G.H. Maize Inbred Lines of Ohio. Ohio A.E.S. Bul. 831. 1959.

Butler, D.R. 1954 – A System for the Classification of Corn Inbred Lines – PhD. Thesis, Ohio State University.

COMMENTS: Heat units are accumulated from daily temperatures as follows:
HI = Maximum air temperature in Fahrenheit, but not greater than 86.
LO = Minimum air temperature in Fahrenheit but not less than 50.
Heat Units = (HI + LO)/2 - 50, but not less than 0.

6

14D. Exhibit D. Additional Description of 'PHG29'

'PHG29' is a yellow dent inbred line of corn, Zea mays L.

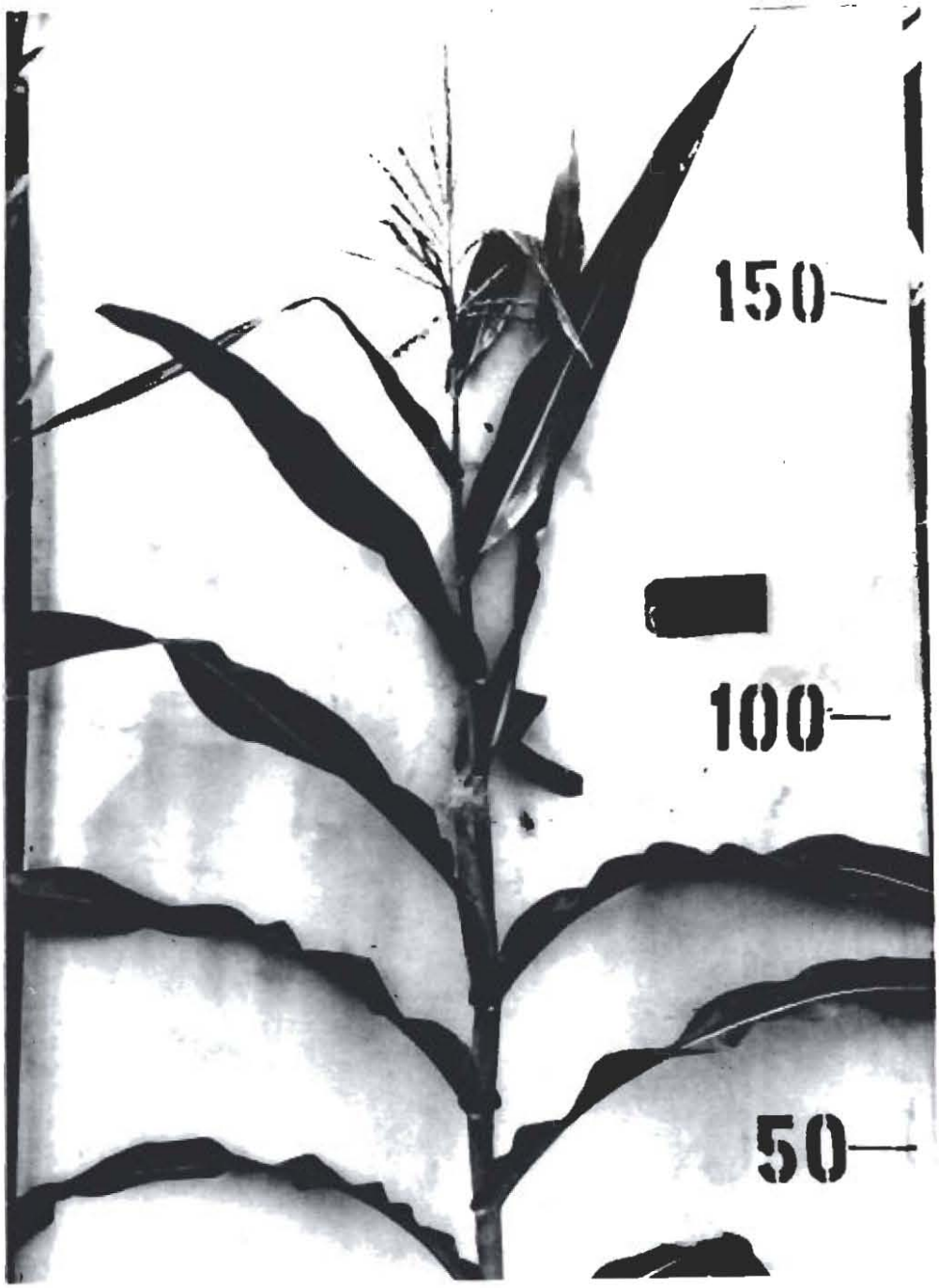
As an inbred per se, PHG29 is similar to the Pioneer proprietary inbred line 207, however, there are some distinguishable differences between the two inbreds as stated in Exhibit B. PHG29 is characterized by producing hybrids with thick ears and wide, deep kernels. For comparative purposes, data are attached with comparisons of PHG29 to Pioneer Inbred line 207 (crossed to the same tester lines and evaluated in the same locations).

14D. Exhibit D. Comparison of PHG29 and Pioneer inbred line 207 crossed to the same tester lines and the hybrids evaluated at the same locations. All values are expressed as percent of the test mean except yield, which is expressed as bushels/acre adjusted to 15.5% grain moisture.

	Inbred	Yield	Percent Yield	Moisture	GDU Shed	Stalk Lodging	Root Lodging	Ears/Plot	Stay Green	Test Weight	Grain Quality	Cob Scores	Seedling Vigor	Plant Height	Ear Height		
No. of Reps.		64	64	64	11	64	33	14	41	64	62	6	23	31	31		
	PHG29	149	107	105	101	102	103	104	124	100	96	102	100	101	101		
	207	140	100	98	99	105	105	101	91	100	97	105	93	98	98		
Diff.		9	7	7	2	3	2	3	33	0	1	3	8	3	3		

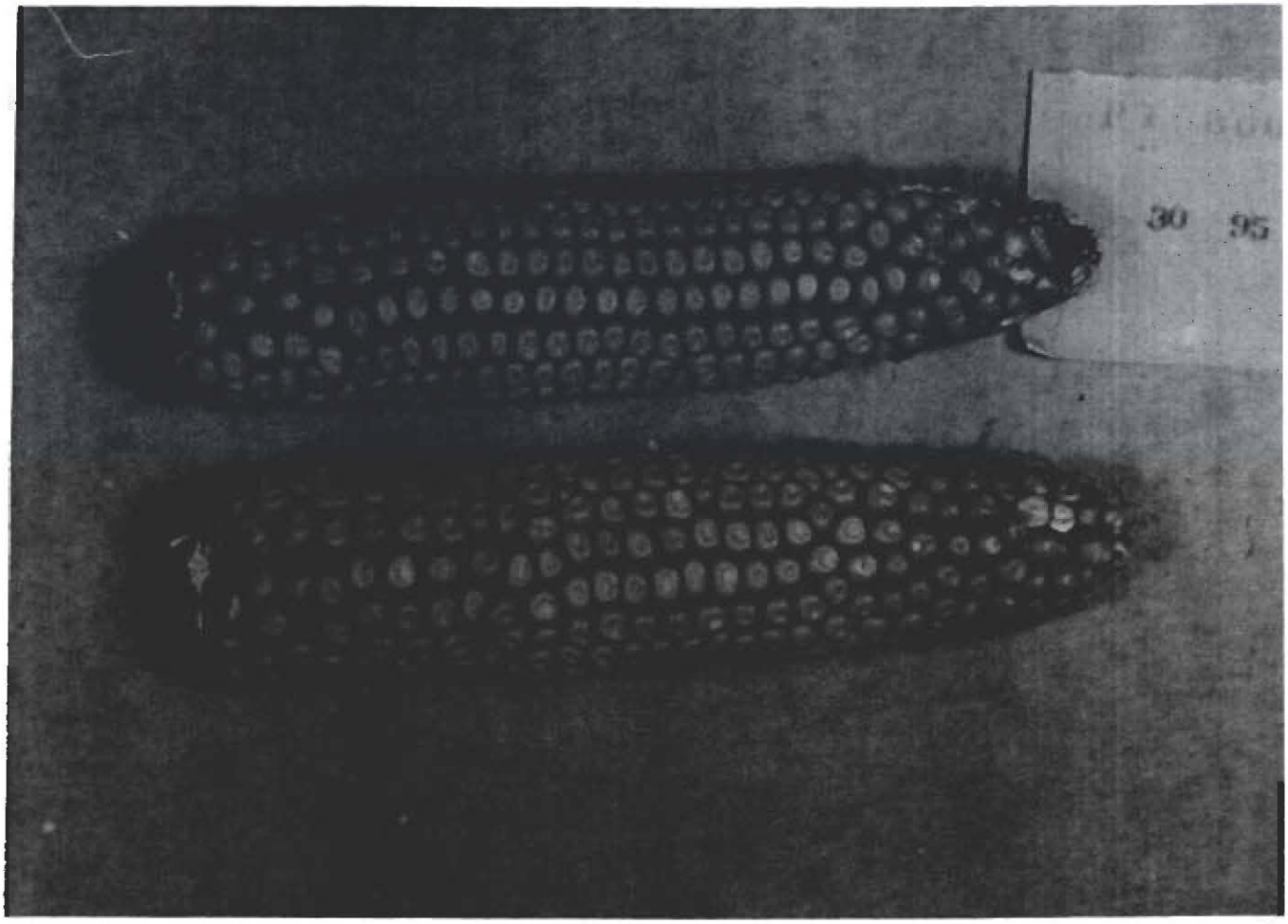
14D. Exhibit D. Additional Description of PHG29 (continued).

a. Whole Plant



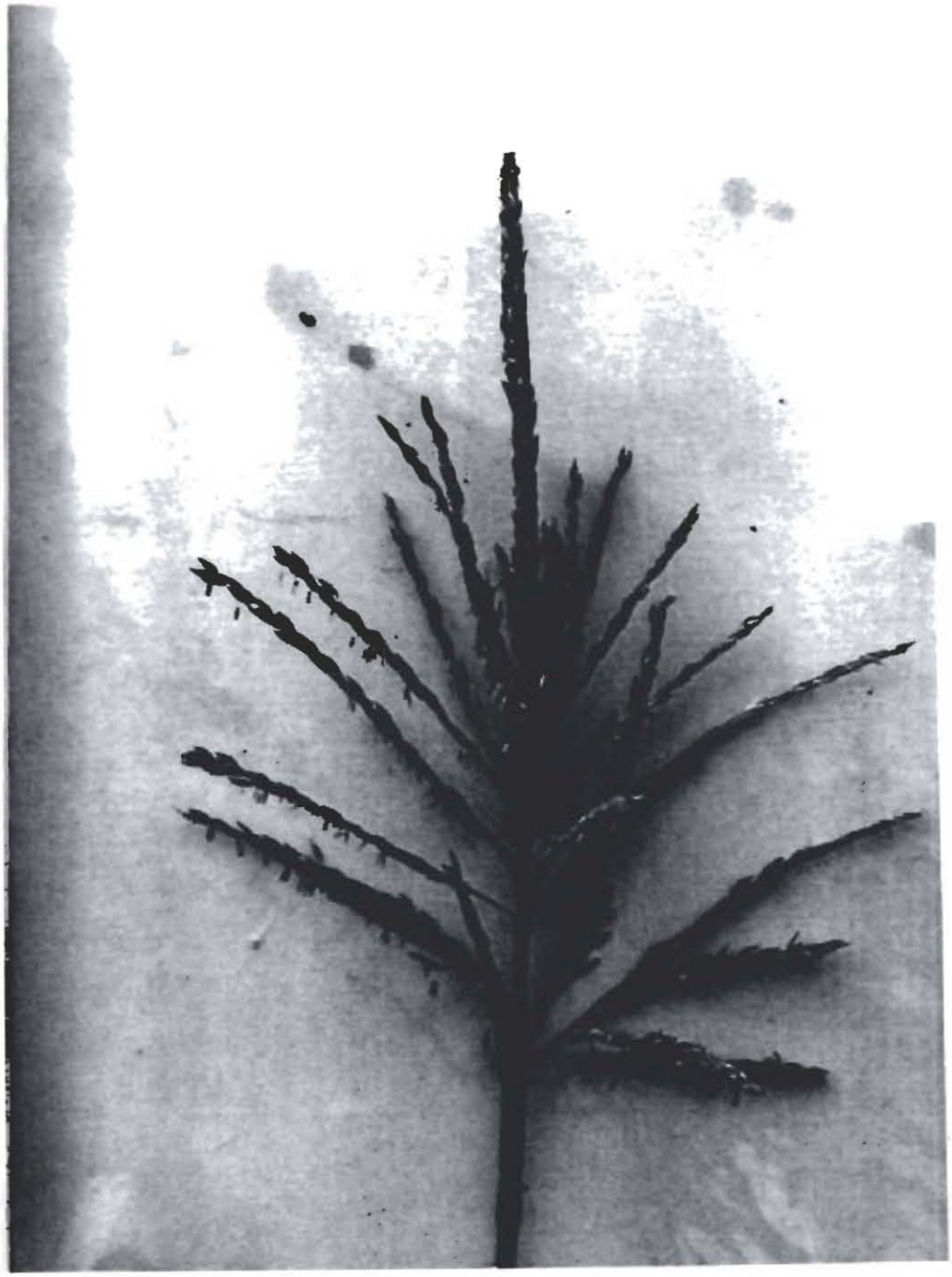
14D. Exhibit D. Additional Description of PHG29 (continued).

c. Ear



14D. Exhibit D. Additional Description of PHG29 (continued).

b. Tassel



14E. Exhibit E. Statement of Basis of Applicant's Ownership.

Pioneer Hi-Bred International, Inc., Des Moines, Iowa, is the employer of the plant breeders involved in the selection and development of PHG29. Pioneer Hi-Bred International has the sole rights and ownership of PHG29.